

Claims

We claim:

1. A method for pest control wherein said method comprises exposing said pest to a compound which disrupts, within said pest, an organic solute transporter/ligand-gated ion channel protein.

2. The method, according to claim 1, wherein said method comprises exposing said pest to a compound which disrupts the function of a CAATCH1 protein.

3. The method, according to claim 2, wherein said CAATCH1 protein comprises the amino acid sequence shown in SEQ ID NO: 2, or a portion of said sequence wherein said portion has CAATCH1 biological activity.

4. The method, according to claim 1, wherein said method comprises exposing said pest to an amino acid which disrupts said organic solute transporter/ligand-gated ion channel protein.

5. The method, according to claim 4, wherein said amino acid is selected from the group consisting of methionine, leucine, histidine, glycine, threonine, beta-alanine, alanine and their analogs; wherein, for each amino acid, the amino acid may be in a racemic mixture or in an enantiomerically-enriched L- or D- form.

6. The method, according to claim 5, wherein said amino acid is methionine or leucine.

7. The method, according to claim 6, wherein said amino acid is methionine.

8. The method, according to claim 1, which comprises exposing said pest to a host which has been transformed to express said compound.

9. The method, according to claim 8, wherein said host is selected from the group consisting of plants, algae, bacteria, and yeast.

10. The method, according to claim 9, wherein said host is a plant.

5

11. The method, according to claim 10, wherein said plant is selected from the group consisting of the Family *Solanaceae*; *Solanum spp.*; *Glycine spp.*; Family *Fabaceae*; *Zea mays*; *Zea spp.* and *Nicotina spp.*

10 12. The method, according to claim 1, wherein said pest is selected from the group consisting of Lepidopterans, Coleopterans, and Diptera.

13. The method, according to claim 12, wherein said pest is in the order Coleoptera.

15 14. The method, according to claim 13, wherein said coleopteran is a *Leptinotarsa spp.*, rootworm, or weevil.

15. The method, according to claim 12, wherein said pest is in the order Diptera.

20 16. The method, according to claim 15, wherein said lepidopteran is selected from the group consisting of cutworms, budworms, leafworms, earworms, and armyworms.

17. The method, according to claim 12, wherein said pest is in the order Diptera.

25 18. The method, according to claim 17, wherein dipteran is a mosquito.

19. The method, according to claim 1, wherein said pest is selected from the group consisting of cockroaches, ants, termites, and nematodes.

20. The method, according to claim 1, wherein said pest has an alkaline gut compartment.

21. The method, according to claim 1, wherein said pest has a V-type ATPase.

5

22. The method, according to claim 1, wherein said pest has a protein encoded by a gene which hybridizes, under high stringency conditions, with at least 15 contiguous bases of SEQ. ID NO.:1, or the complement of SEQ ID NO: 1.

10

23. The method, according to claim 1, wherein said compound is selected from the group consisting of antibodies, antisense polynucleotides, and RNAi.

24. The method, according to claim 23, wherein said antibody immunoreacts with a CAATCH1 protein.

15

25. The method, according to claim 24, wherein said CAATCH1 protein comprises SEQ ID NO: 2, or a portion thereof which has CAATCH1 biological activity.

20

26. The method, according to claim 23, wherein said antisense polynucleotide or RNAi targets a sequence of at least 15 contiguous bases of SEQ ID NO: 1, its complement, or corresponding RNA, or sequences upstream or downstream of SEQ ID NO: 1 in said target pest.

25

27. A composition comprising a pesticidal amount of a compound which disrupts, within a target pest, an organic solute transporter/ligand-gated ion channel protein.

28. The composition, according to claim 27, wherein said compound is an amino acid.

30

29. The composition, according to claim 28, wherein said amino acid is selected from the group consisting of methinine, leucine, histidine, glycine, threonine, beta-alanine, alanine

and their analogs; wherein, for each amino acid, the amino acid may be in a racemic mixture or in an enantiomerically-enriched L- or D- form.

5        30. The composition, according to claim 29, wherein said amino acid is methionine or leucine.

31. The composition, according to claim 30, wherein said amino acid is methionine.

10        32. The composition, according to claim 27, wherein said composition comprises a transformed host which expresses said compound.

33. The composition, according to claim 32, wherein said host is selected from the group consisting of plants, algae, bacteria, and yeast.

15        34. The composition, according to claim 33, wherein said host is a plant.

35. The composition, according to claim 34, wherein said plant is selected from the group consisting of the Family *Solanaceae*; *Solanum spp.*; *Glycine spp.*; Family *Fabaceae*; *Zea mays*; *Zea spp.* and *Nicotina spp.*

20        36. A method for identifying a CAATCH1 protein comprising the use of antibodies generated an epitope of SEQ ID NO:2, and detecting binding between said antibodies and said CAATCH1 protein.

25        37. A method for detecting CAATCH1 genes comprising the use of an oligonucleotide probe of SEQ ID NO:1, and detecting hybridization between said oligonucleotide probe and a target sequence.

30        38. A method for controlling a pest wherein said method comprises administering to said pest an effective amount of an amino acid or an analog thereof.

39. The method, according to claim 38, wherein said amino acid is selected from the group consisting of methionine, leucine, histidine, glycine, threonine, beta-alanine, alanine and their analogs; wherein, for each amino acid, the amino acid may be in a racemic mixture or in an enantiomerically-enriched L- or D- form.